



Jurnal Masharif al-Syariah: Jurnal Ekonomi dan Perbankan Syariah
ISSN: 2527 - 6344 (Printed), ISSN: 2580 - 5800 (Online)
Accredited No. 204/E/KPT/2022
DOI: <https://doi.org/10.30651/jms.v10i4.27564>
Volume 10, No. 4, 2025 (3092-3103)

FACTORS AFFECTING CAPITAL BUFFER IN INDONESIA ISLAMIC BANKING BY PANEL REGRESSION APPROACH

Zenny Nurul Aini Azhari

UIN Sayyid Ali Rahmatullah Tulungagung

zeni4166@gmail.com

Rendra Erdkhadifa

UIN Sayyid Ali Rahmatullah Tulungagung

rendra.erdkhadifa@gmail.com

Abstract

This study is driven by the essential role of the capital buffer in ensuring the financial stability and sustainability of banks. While a high capital buffer enhances stakeholder confidence, it may reduce profit potential due to underutilized funds. Conversely, a low capital buffer may signal higher risk, especially during economic downturns. Thus, analyzing internal factors influencing capital buffer levels in Islamic Commercial Banks is crucial. This research adopts a quantitative method with an associative design. It utilizes secondary data sourced from the annual financial statements of 10 Islamic Commercial Banks in Indonesia covering the years 2019 to 2023, selected through purposive sampling. The data is analyzed using panel data regression, with the common effects model chosen as the most appropriate. The findings indicate that ROA, NPF, and bank size collectively exert a significant influence on the capital buffer. Individually, ROA has a significant positive impact, whereas both NPF and bank size show significant negative impacts. The study concludes that these three factors ROA, NPF, and bank size play a vital role in shaping the capital buffer. These findings highlight the importance for banks to maintain profitability and manage credit risk effectively to support regulatory compliance and stakeholder trust.

Keywords: Bank Size, Capital Buffer, Non Performing Financing, Return on Asset

1. Introduction

A Sharia Bank is a financial institution that operates in accordance with Islamic principles, primarily functioning to gather funds from surplus units (those with excess capital) and channel them to deficit units (those in need of financing). In performing its functions, a Sharia bank is required to maintain public trust, one of which is through

having adequate capital. Capital is necessary to provide protection in the event of investment losses, particularly losses involving assets sourced from public funds (Muhammad, 2005). Moreover, capital also serves as a buffer to absorb operational losses. In addition, sufficient capital can protect the bank from unexpected risks and help maintain public confidence.

The Financial Services Authority has established minimum capital requirements through POJK No. 34/POJK.03/2016, which mandates that banks must maintain a minimum capital of 8% of risk-weighted assets (Otoritas Jasa Keuangan, n.d.-b). This regulation also aligns with international standards established by the Basel Committee on Banking Supervision (BCBS), specifically Basel I, II, and III frameworks which encourage banks to develop stronger and more resilient capital management systems to withstand various risks.

One of the primary indicators used to assess a bank's capital adequacy is the CAR. Between 2019 and 2023, Islamic Commercial Banks in Indonesia exhibited strong capital performance, consistently maintaining CAR levels above the regulatory minimum threshold of 8% (Otoritas Jasa Keuangan, n.d.-a). Nevertheless, a high CAR does not inherently ensure a bank's resilience under extreme economic stress. Therefore, maintaining capital buffers is recommended to enhance the bank's ability to absorb unexpected losses and preserve financial stability.

A capital buffer is additional capital that serves as a cushion in the event of losses during a crisis period or as the difference between a bank's capital ratio and the regulatory minimum capital adequacy threshold set at 8%. Capital buffers act as a safeguard to absorb potential losses that may arise from excessive credit and financing growth, as well as during times of financial crisis. A capital buffer is necessary because each bank may have a different risk assessment compared to the regulatory standards set by the government. Moreover, the minimum capital requirements established by regulators may not be sufficient to cover potential losses that a bank might incur. Therefore, banks are required to hold capital buffers as a protective measure against potential losses resulting from capital shocks and challenges in obtaining additional capital (Shim, 2013).

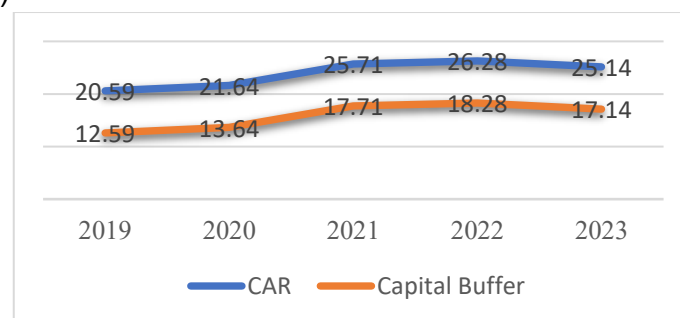


Figure 1. Car and capital buffer conditions of islamic commercial banks in indonesia, 2019-2023

Based on Figure 1, Islamic Commercial Banks demonstrated a relatively high average capital buffer. The development of the capital buffer showed an upward trend over the years, although it experienced a decline in 2023. In 2019, the capital buffer was recorded at 12.59%. Referring to the Basel III agreement, the capital buffer in that year had not yet met the standard expected of banks. From 2020 to 2021, the capital buffer increased by 4.07%, indicating strong financial performance, particularly in improving the bank's capital management system.

According to Basel III theory, the capital buffer is calculated as the difference between a bank's CAR and the minimum CAR requirement of 8%. In other words, the higher a bank's CAR, the larger its capital buffer. The highest capital buffer was recorded in 2022, reaching 20.09%. While an increase in capital buffer reflects stronger capitalization, excessive retained capital can reduce efficiency and limit the bank's earning potential. Funds that could otherwise be allocated to support operational activities and enhance profitability are not being utilized optimally (Chabahib, 2014). Conversely, in 2023, the capital buffer declined compared to the previous year. This decrease indicates that Islamic Commercial Banks engaged in more aggressive financing activities, accompanied by an increased risk of default. Therefore, maintaining a balanced level of capitalization is essential to ensure the financial soundness of the bank.

Internal factors such as ROA, NPF, and bank Size are considered to influence capital buffers. The ROA ratio reflects the ability of bank management to generate overall profits (Dendawijaya, 2003). Banks with higher ROA tend to be more capable of forming larger capital buffers. According to the Pecking Order Theory, banks prefer to use retained earnings as a cheaper source of internal capital (Najmudin, 2011). Therefore, the greater the ROA generated by a bank, the greater the bank's ability to form a higher capital buffer.

NPF variable reflects the quality of financing and high NPF figures indicate credit risk that erodes capital buffers. According to Bessis, by having adequate capital buffers, banks can absorb losses caused by borrowers or debtors experiencing default (Bessis, 2015). In accordance with the Risk-Based Capital Requirements explained by Mishkin, capital buffers are needed to absorb losses from credit risk. Thus, the capital buffer serves as a cushion that protects the bank from fluctuations caused by credit risk and helps maintain financial stability (S. Mishkin, 2015).

Furthermore, bank size is also believed to influence the capital buffer. Large banks have better operational efficiency in strengthening their capital buffers. The larger the bank the more it tends to maintain a lower capital buffer compared to smaller banks due to the "Too Big to Fail" nature. This is based on the belief that regulatory authorities are more likely to provide support in the event of financial distress or bankruptcy.

Several previous studies have examined the factors influencing capital buffers in Islamic commercial banks. Boku et al. (2023) found that profitability had a significant positive effect (Boku et al., 2023). Research conducted by Tanjung et al. (2023) showed that NPF had no significant effect, while bank size has a significant influence. However, simultaneously, NPF and bank size were found to have a significant effect (Tanjung et al., 2023). Research by Septiarini et al. (2021) showed that ROA had a significant positive effect. Conversely, company size had a significant negative effect, while NPF showed an insignificant positive effect (Septiarini et al., 2021). Based on the above findings and variations in previous research results, the authors are interested in conducting a study entitled: "Factors Influencing Capital Buffers in Indonesian Islamic Banking Using a Panel Regression Approach."

2. Literature Review

2.1 Signaling Theory

Signaling theory, developed by Spence in 1973, explains that parties with more information, such as company management, will send signals to external parties, such as investors, to reduce information asymmetry. These signals are typically conveyed through financial reports that reflect the company's condition and performance. Investors then interpret this information as good or bad news, influencing investment decisions. Companies with good performance tend to send positive signals to demonstrate their superiority over companies with poor performance (Br Purba, 2023).

2.2 Capital Buffer

A capital buffer is a capital reserve provided by a bank in excess of the minimum limit set by regulators. This reserve serves as a layer of protection against potential financial risks, such as disrupted liquidity or the threat of bankruptcy (Andiani, 2017). Banks' capital retention is driven by various considerations, such as maintaining operational continuity, avoiding capital mismatches, and complying with regulatory requirements (Shim, 2013). Although high capital accumulation can reduce returns for shareholders, it is essential as a risk mitigation measure. Bank Indonesia regulates capital buffer requirements through Bank Indonesia Regulation No. 17/22/PBI/2015 concerning countercyclical capital buffers, which are additional capital to anticipate risks resulting from excessive credit surges that could potentially disrupt financial system stability. This regulation refers to international standards from the Basel Committee on Banking Supervision (BCBS), which introduced the Basel Accord framework to enhance banking capital resilience.

The Basel Accord is a set of banking regulations aimed at ensuring that financial institutions have sufficient capital to meet all obligations and absorb any unexpected losses (Khusna Khanifa, 2019). Basel I emphasizes a minimum capital requirement of 8%. Furthermore, Basel II strengthens this requirement with a risk management approach to credit, market, and operational risks. In response to the global financial crisis, Basel III was designed to improve both the quality and quantity of bank capital,

including the provision of capital buffers to cope with unexpected financial stress. Under the Basel III framework, capital buffers are measured by the difference between the Capital Adequacy Ratio and the minimum CAR standard.

2.3 Return on Asset

Return on Assets is an indicator used to assess a bank's effectiveness in utilizing its total assets to generate profit. ROA is obtained by comparing pre-tax profit to average total assets. This ratio reflects the extent to which management is able to utilize assets derived from public funds to generate profits (Dendawijaya, 2003). The higher the ROA, the better the bank's performance in managing assets productively. According to the Pecking Order Theory, companies tend to rely on retained earnings as a source of internal financing rather than issuing more expensive shares. Therefore, the greater the retained earnings, the stronger the bank's capital, ultimately strengthening its capital buffer and resilience to economic risks.

2.4 Non-Performing Financing

Non-Performing Financing is an indicator that reflects the level of problem financing at a bank, calculated from the ratio of problem financing, which includes substandard, doubtful, and loss financing, to total financing. NPF is used to measure a bank's effectiveness in managing credit risk and financing quality. A high NPF level indicates a debtor's low ability to meet payment obligations, which impacts cash flow declines, increased provisioning costs, and reduced bank profits (Kasmir, 2014). In risk management, increasing NPFs require greater provision of loss reserves to cover potential defaults. This also encourages banks to strengthen capital buffers to maintain financial stability and meet minimum capital requirements as a precaution against increasing credit risk.

2.5 Bank Size

Bank size is an indicator that describes the scale of a bank's operations, usually measured by the total assets owned and expressed in logarithmic form. (Haryanto, 2015). Larger banks tend to have greater ability to obtain funding and diversify assets, thus being considered more financially stable. According to the Too Big To Fail theory, large banks are believed to be less likely to fail due to the assistance provided by regulators in the event of a crisis. This leads large banks to often maintain lower capital buffers. Conversely, smaller banks tend to maintain higher capital buffers as a precautionary measure against unexpected financial risks. (Investopedia, n.d.).

3. Research Methods

This study demonstrates the existence of relationships between variables using an associative quantitative research approach. This study applies purposive sampling, resulting in a selection of 10 Islamic Commercial Banks. Data were obtained through documentation by collecting annual financial statements of the chosen banks for the 2019–2023 period from their official websites. The research involves independent variables (X) ROA, NPF, and bank size and one dependent variable (Y), which is the

capital buffer. The data were analyzed using panel data regression, with processing conducted using EViews 12 software. The model integrates both time series and cross-sectional data, employing the following regression equation:

$$Y_{it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + e \quad (1)$$

The model consists of six independent variables, namely ROA (X_1), NPF (X_2), and bank size (X_3), with Y_{it} representing the response variable, which is capital buffer. The symbol β_0 denotes the constant derived from the analysis results, while β represents the regression coefficients of each independent variable. The subscript i refers to the number of Islamic Commercial Banks, which consists of 10 banks. Meanwhile, t indicates the study period, which spans from 2019 to 2023, and e represents the error term.

4. Result and Discussion

4.1 Result

a. Descriptive Statistics

Presented below are the results of the descriptive statistical analysis conducted in this:

Table 1. Descriptive statistics

<i>Variable</i>	<i>Min</i>	<i>Max</i>	<i>Mean</i>	<i>Std. Deviation</i>
Capital Buffer	4.420	141.680	23.671	20.814
ROA	-7.130	13.580	1.468	3.566
NPF	0.500	9.540	2.729	2.079
Bank Size	14.320	18.020	16.362	0.842

Source: Output Eviews 12

Table 1 presents the results of the descriptive statistical analysis. The capital buffer variable has a minimum value of 4.420, recorded by Bank Muamalat Indonesia in 2019, and a maximum value of 141.680, observed at Bank Victoria Syariah in 2022. The average capital buffer stands at 23.671, with a standard deviation of 20.814. For the ROA variable, the lowest value is -7.130, reported by KB Bukopin Syariah in 2023, while the highest is 13.580, achieved by BTPN Syariah in 2019. The mean ROA is 1.468, with a standard deviation of 3.566. The NPF variable ranges from a minimum of 0.500 at BCA Syariah in 2020 to a maximum of 9.540 at Bank Victoria Syariah in 2021, with an average of 2.729 and a standard deviation of 2.079. Finally, the bank size variable has a minimum value of 14.320, recorded by Bank Victoria Syariah in 2021, and a maximum of 18.020, reported by Bank Muamalat Indonesia in 2023. The average bank size is 16.362, with a standard deviation of 0.842.

b. Multicollinearity Test

The findings of the multicollinearity test conducted in this study are presented below:

Table 2. Multicollinearity test results

<i>Variable</i>	<i>VIF</i>
ROA	1.101
NPF	1.239
Bank Size	1.178

Source: Output Eviews 12

Table 2 presents the results of the multicollinearity test, which show that all independent variables have Variance Inflation Factor (VIF) values less than 10. This indicates the absence of multicollinearity in the regression model, meaning there is no strong linear relationship among the independent variables.

c. Panel Data Regression Analysis

Before estimating panel data regression model, several series of tests were carried out, as follows:

1) Chow Test

Resented below are the results of the Chow test conducted in this study:

Table 3. Chow test results

<i>Effect Test</i>	<i>Prob.</i>	<i>Conclusion</i>
Cross-section F	0.131	Common Effect

Source: Output Eviews 12

The Chow test results indicate that the Prob. Cross-section F value is 0.131, which exceeds the significance threshold. As a result, H0 is accepted, leading to the conclusion that the Common Effect Model is the most suitable model for this study.

2) Lagrange Multiplier Test

The following are the results of the lagrange multiplier test in this study:

Table 4. Lagrange multiplier results

<i>Hypothesis Test</i>	<i>Prob</i>	<i>Conclusion</i>
Breusch-Pagan	0.642	Common Effect

Source: Output Eviews 12

The Lagrange Multiplier test results reveal that the Prob. cross-section Breusch-Pagan value is 0.642, which is above the significance level. Consequently, H0 is accepted, indicating that the Common Effect Model is the appropriate choice for this study.

d. Result of Common Effect Model Panel Regression Analysis

Based on the results of the Chow and Lagrange Multiplier tests, the Common Effect Model was determined to be the most suitable. The outcomes of Common Effect Model estimation in this case are presented as follows:

Table 5. Common effect results

<i>Factors</i>	<i>Coefficient</i>	<i>Std. Error</i>
C	228.363	54.527
ROA	1.747	0.742
NPF	-3.473	1.350
Bank Size	-12.087	3.248

Source: Output Eviews 12

Referring to Table 5, the resulting regression equation model is as follows:

$$Y_{it} = 228.363 + 1.747X_{1it} - 3.473X_{2it} - 12.087X_{3it} + \varepsilon_4 \quad (2)$$

Based on the panel data regression model, the constant value is 228.363, indicating that when all independent variables (ROA, NPF, and bank size) are held at zero, the capital buffer is expected to be 228.363. This serves as the baseline level of the capital buffer in the absence of influence from the independent variables. ROA has a positive coefficient of 1.747, indicating a positive relationship between ROA and the capital buffer. An increase in ROA by one unit will increase the capital buffer by the corresponding coefficient value. Meanwhile, NPF and bank size have coefficients of -3.473 and -12.087, respectively. The negative values of these coefficients indicate a negative influence on the capital buffer. Therefore, an increase of one unit in NPF or bank size will reduce the capital buffer in accordance with the respective coefficient values of these independent variables.

e. Coefficient of Determination

The findings from the coefficient of determination (R^2) test in this study are presented below:

Table 6 Results of determination coefficient test

<i>Goodness of Model</i>	<i>Value</i>
R^2	0.324

Source: Output Eviews 12

As presented in Table 6, the coefficient of determination (R^2) is 0.324 or 32.4%. This means that 32.4% of the variation in the dependent variable can be explained by the independent variables in the model, while the remaining 67.6% is influenced by other factors outside the scope of the model.

f. Simultaneous Test

The results of the simultaneous test in this study can be shown in Table 7.

Table 7 Simultaneous test results

<i>F-count</i>	7.370
<i>Prob.</i>	0.000

Source: Output Eviews 12

The results of the simultaneous test presented in Table 7 indicate that the calculated F-value is 7.370, which exceeds the F-table value of $F_{0,05}(2;47) = 2.802$. Since the F-value is greater than the critical value, H_0 is rejected. Thus, it can be concluded that ROA, NPF, and bank size collectively have a significant effect on capital buffers.

g. Partial Test

The result of partial test in this study can be show in Table 8.

Table. 8 Partial test results

<i>Variable</i>	<i>t-test</i>	<i>Prob.</i>
ROA	2.354	0.022
NPF	-2.572	0.013
Bank Size	-3.720	0.000

Source: Output Eviews 12

Based on the results of the partial test, the critical t-value at the 5% significance level is $t_{(46; 0.025)} = 2.012$. The t-statistic values for ROA, NPF, and bank size are 2.354, $|-2.572|$, and $|-3.720|$, respectively each exceeding the critical value. Furthermore, the corresponding significance p-values for all three variables are below 0.05. Therefore, H_0 is rejected, indicating that ROA, NPF, and bank size each have a statistically significant effect on the capital buffer.

h. Classical Assumption Test

1) Heteroscedasticity Test

The results of the heteroscedasticity test conducted using the Glejser method are presented below:

Table. 9 Heteroscedasticity test results

<i>Variable</i>	<i>Prob.</i>
ROA	0.722
NPF	0.731
Bank Size	0.754

Source: Output Eviews 12

As shown in Table 9, the probability values for all three variables exceed the significance threshold of 0.05. This suggests that the regression model does not exhibit any heteroscedasticity issues.

2) Normality Test

The following are the results of the normality test:

Table. 10 Normality test results

<i>Probability</i>	<i>Conclusion</i>
0.534	Normal Distribution

Source: Output Eviews 12

Table 10 indicates that the probability value is 0.534, which exceeds the 5% significance level ($0.534 > 0.05$). Therefore, it can be concluded that the residuals in the panel data regression model is normal distribution.

4.2 Discussion

Based on the test results, it was determined that ROA, NPF, and bank size collectively have a significant influence on the capital buffer of Islamic Commercial Banks for the period 2019–2023. This finding shows that the four variables make a significant contribution to the formation of the capital buffer. This result is in line with the Too Big to Fail concept which states that the capital buffer is influenced by several main factors, including the level of financing risk, profitability, and bank size. Therefore, these three variables are the main indicators in assessing the bank's ability to maintain capital resilience in the face of economic uncertainty.

The research findings indicate that ROA has a significant positive impact on the capital buffer of Islamic Commercial Banks. This implies that as a bank's profitability increases, its retained earnings also rise, thereby strengthening its capital buffer. This retained earnings is a source of internal funding that is used to strengthen bank capital. Thus, increasing profits has a positive impact on strengthening bank capital which can ultimately strengthen bank capital reserves. This finding is consistent with the Pecking Order Theory, which suggests that highly profitable firms tend to prioritize internal financing over external sources. Consequently, the accumulation of retained earnings supports the improvement of the CAR, thereby strengthening the bank's capital reserves. A strong capital buffer is essential in maintaining a bank's resilience against financing risks, asset quality deterioration, and market uncertainty.

The test results for the NPF variable indicate that NPF has a significant negative effect on the capital buffer of Islamic Commercial Banks. This inverse relationship arises because a higher NPF reflects increased financing risk. As NPF rises, it tends to weaken the bank's capacity to accumulate capital reserves. An increase in the NPF ratio reflects the high risk of problematic financing, which requires banks to provide larger reserves to cover potential losses. These large reserves reduce the profit that can be allocated to strengthen core capital. In addition, increased credit risk encourages banks to meet higher minimum capital requirements, which ultimately reduces CAR and weakens the capital buffer. A weak capital buffer reflects a reduced bank resilience to potential losses. In addition, a high NPF ratio also indicates weak financing risk management. Therefore, strengthening the risk management system and implementing the principle of prudence are important steps in maintaining the resilience of bank capital and the stability of its capital buffer.

The test results for the bank size variable show that bank size has a significant negative effect on the capital buffer of Islamic Commercial Banks. This indicates that an increase in bank size tends to reduce the level of capital reserves maintained. This finding is consistent with the Too Big to Fail theory, which suggests that larger banks

tend to maintain lower capital buffers, as they are perceived to carry lower risk and are more likely to receive regulatory support in times of financial distress. Banks with increasing total assets generally maintain their CAR in line with regulatory requirements. However, if asset growth is not accompanied by a corresponding increase in capital, it can reduce the bank's ability to absorb risk. Although these banks may meet the minimum CAR, a declining capital buffer reflects a tendency to prioritize fund allocation toward financing activities rather than strengthening risk reserves. Thus, the reduction in capital buffer among larger banks indicates a managerial preference for expanding financing over building additional capital reserves. While this strategy may enhance capital efficiency, it potentially weakens the bank's resilience to external financial pressures in the future.

5. Conclusion and Suggestions

Based on the data analysis and interpretation of the findings, it can be concluded that ROA, NPF, and bank size collectively have a significant impact on the capital buffer. This highlights the crucial role of financial performance in determining the adequacy of a bank's capital buffer, which when managed effectively can enhance the bank's capital strength. A robust capital buffer enables Islamic Commercial Banks to better withstand financial risks and maintain operational stability. Individually, ROA has a significant positive effect on the capital buffer, indicating that higher profitability contributes to stronger internal capital and greater resilience to financial shocks. Conversely, both NPF and bank size exhibit significant negative effects. A rise in NPF signals increased financing risk, which may erode the bank's capital reserves. Moreover, larger banks tend to assume greater risks, often maintaining relatively lower capital buffers, suggesting that as bank size increases, the capital buffer tends to decrease.

Based on the findings of this study, it is recommended that Islamic Commercial Banks carefully determine their capital buffer levels to anticipate potential future risks. This can be achieved by increasing profits that can be allocated to strengthen the capital buffer in line with the risk profile of the bank's assets. Additionally, banks should be more selective in financing distribution to reduce the NPF ratio, which may weaken capital adequacy. Consideration of bank size is also important, given the differing risk management strategies between large and small banks in maintaining capital buffer stability.

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